



Revisiting Highland Lake Flooding Fall 2018: Why Travis County WCID 17 Survived Unscathed

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0:04

Good afternoon. Welcome to our discussion today on the fall floods of 2018.

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Have one utility in Travis County WCRF 17, was able to survive that flooded them and continue to produce water for its customers.

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We're pleased today to be joined by mister Jason.

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Jason Homan, the General Manager of Travis County, WCAG 17 and Jason, want to introduce yourselves to the audience.

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Yeah, Thanks, Pat. Good morning everybody, or good afternoon, depending on what time you look at this. I'm the General Manager here at ... 17. I've been here for four years. I came here following 20 years of experience in the US. Navy, particularly in the nuclear power field, spending the majority of my time in regulatory compliance and safety compliance for our water purity and water chemistry as well as our Radiological Safety and Analysis Fields.

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Thanks, Jason.

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My name is Patrick Lackey, I'm a senior engineer, we tried road. I have a P.E. license from the state of Texas, and also double a license for water, wastewater operations from TCK.

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I have graduate degrees from Texas A&M University, Civil Engineering, and Microbiology.

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I have over 40 years experience doing water, wastewater, consulting in Central Texas.

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Had the good fortune of working with Travis County, WCRF 17, since 19 80 for so, many of the items were talking about was actively involved in the planning and implementation of the various strategies that went into the preparation for this flood event.

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So, the next slide.

2:02

Yeah, the Water District was created by the Travis County Commissioners Court in 19 59.

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It is located on the South Shore of Lake.



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Travis can encompass today about 16,000 acres.

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It is located roughly 10 miles from downtown Austin.

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It currently has a service population of about 45,000.

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It operates to surface water treatment plants, so we'll be talking about today, the ... Lane Plan, and the Mansfield plan.

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It also operates for wastewater treatment plants, work on-site disposal and beneficial re-use.

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The it is also included in the jurisdiction.

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three municipalities, City of Austin, City ..., city of beaches.

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In the 19 nineties, the district saw near double digit growth, Is it expanded due to pressure from suburban Austin, the attractive environment of the lake?

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Uh, the like, school population school, high school accreditations and the beneficial utilities are located along the way.

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The Colorado River through, like, Travis, like Austin, separate the District North and South.

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And that creates some problems in serving population centers on either side or the like.

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Like, Travis is famous for its variable level conditions, they can fluctuate as much as 30 to 50 feet in Summer.

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And the challenges are from hydroelectric power in the lake.

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Towns drain downstream, agricultural diversions in its primary function as a flood control like in the Highland Lakes system.

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T, like Travis is located on the Colorado River in Central Texas.

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In the fall of 2018, a 30 inch rainfall event happened just west Junction taxes on the Lana River show.

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That flooding there cause downstream flooding throughout the lake system.

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Primary flood control, a common law system, is became a dam, and because the rainfall occurs below the **** it missed, and floodwaters came quickly downstream.

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Through, like, LBJ like Horrible Falls and eventually to like, Travis.

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The, uh, Lakes are primarily for flood control purposes, but hydroelectric power is generated from the Lakes, yeah.

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And water is stored used for downstream water, resource projects, primarily agricultural use down along the coastline.

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The Colorado River basin tidal light chain earns his reputation as Flash Flood Alley.

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As the flooding events can quickly pass through the lake system quickly downstream from the time raines began to fall up in the Junction area, it was a little over two to a little over a day and a half before. Like Travis was beginning to see the effects of those rainfall events.

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When it came, it came very quickly, P, So, you can see on the map here. Time travel through delay occurs quite quickly.

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In downtown Austin would see any effects within three days.

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There was no time to prepare for this specific flood event as the waters came quite quickly.

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OK, during this flooded them, the lakes were already full, they receive fall rains and had recovered from a 50 foot drought deficit the following year.

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As you can see on this timeline, major flood events are no stranger to the Colorado River Ice and most recently, beginning in December of 1991, there has been re-occurring flooding events on Lake Travis and uh, the district as the major water customer on the lake has been forced to deal with these flood events.



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And plan accordingly for operation and treatment.

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The watershed is developing more rapidly with more growth comes higher runoff.

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And the steep topography of the watershed is instrumental in developing flows happening quickly in the watershed.

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So in October 2018, the waters came quite quickly.

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The many of the utilities were unprepared for the rise in water levels, as well as the turbidity and debris that came downstream with a flood event.

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Boil water notices went up throughout the watershed and, uh, utilities, customers were challenged to find adequate water supplies to continue their daily life.

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It was a very chaotic system situation that had not occurred recently.

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Travis County seat to VCI to 17 was successful in preparing and operating to get through this flooding event system.

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Jason.

8:33

Yeah.

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Um, well, beginning in the 19 nineties, the district recognized that there was a significant shift and our population density and that the growth was looking to rise significantly in the coming decades.

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So uh, concerted effort was taken to review reliability and redundancy that existed throughout the district. Some of the challenges that will recognize that we would need to overcome whereas, as Pat has alluded to already, the variable lake levels that we have to deal with here on my Travis. We have some impervious cover issues that we have to deal with our surrounding municipalities that limit the amount of construction we can conduct on a ditch or site.

9:17



For us, it was also the cost of Land Acquisition. With the you know, popularity of the region and the growing interest in summer sports. Along the Lake side, on the land became really expensive. And then on top of that would just be the cost of plant construction.

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So the district worked with the community and the developers to understand the changing nature of the local area population density. We ensured our five year.

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Capital improvements plan process was buttressed with an annual review to verify that our land use assumptions and our water model performance, and our project cost analysis were all standing on target.

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This allowed us to make carefully considered adjustments along the way that paid a lot of great dividends in the long run.

10:04

We also took a look at how we're going to use funding models to address our needs.

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Obviously, the most common one is the bond in tax based funding. Obviously, we would put that to good use in our district, but also, we looked at how we could partner with developers. And through the formation of multiple defined areas, we were able to install the needed infrastructure at a targeted cost to the, the customers who are going to be putting that infrastructure to the most use.

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We also looked at fee based funding as an option for installation to help to avoid increases in tax rates.

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So when we looked to the future, one of the things that we wanted the most accomplished was to leverage technology, we recognized that there was going to be a fundamental shift in how we were going to have to operate. Because of the limitations that we had. one of the things we looked at was membrane technology. This is something that was going to allow us to use a smaller footprint, but to achieve a higher treatment capacity. You also were going to be able to take advantage of the fact that we do have very high quality. here in our lake. We have a lot of our low total organic carbons, and compounds in the wake.

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Make it so that we have a, A wide selection of treatment processes that we could have chosen from.

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We also recognize that, due to the changing water level, you can see 30 to 50 feet in a season as Pat spoke about, that was going to require an investment on us.

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We do have the largest, an intake barge on the lake.

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Um, and investments were made there to ensure that that system was going to stay reliable and redundant.

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We also recognize that because of the increase in population density and the affluent nature of all of our population, there was going to be a high peak day water use demand on our system because of irrigation in the summertime.

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And we needed a system that was going to be care, capable of handling those large summer peaks.

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We also needed to take a look at the redundancy.

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It was going to be necessary because of the fact that our system is quick, as shown in the image earlier. We have half of our district on one side of Colorado River and half on the other, and so that was also something we're going to look to address in the future.

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So what you see here is just an overview of our Clean water treatment facility. This was originally built in the 19 sixties. And we changed from an initial pressure filter, design to a modular filtration and ultimately to the pole system that is currently on on site.

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But because of the very condensed footprint that you can see there, we were forced to take advantage of micro filtration which allowed us to actually build up.

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And so we stacked a second plant on top of our first plant.

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And that allowed us to maintain a concise footprint on our site, but still achieve the increase in capacity that we needed.

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By doing that, we were able to avoid the land acquisition costs that we would have faced here in the region, which were going to be extremely high.

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So taking advantage of this allowed us to use our existing site to avoid those acquisition costs and what Chiba higher quality product with an increased throughput throughout all different influent conditions. And so that was a big advantage that we really did look for when we're choosing your technology.

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This did leave us with a noted redundancy and resiliency issue.

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Based on the fact that we've discussed our service area is split across the Colorado River, that straddling the river left or Northern surface area vulnerable in the case of any extreme calamity, either with the dam or with a major flood event, and so knowing that we looked to address the Northern half of our district.

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Here you can see just a quick overview of our landfill water treatment facility. This facility was completed in 20 16.

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The construction of debt address, the redundancy and resiliency issues that we were concerned about by having an expandable facility on the north side of our district currently. As it sits, it produces six million gallons per day, and we are actually in the process right now of expanding that out to a maximum of 12 million gallons per day once we achieve that, we will have full resiliency throughout our system, and redundancy that allow us to even take our one of our two plants at ... Lane, offline, completely, even during our peak season, at the summertime for maintenance, and things of that nature. So.

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There were some very special considerations we took when we built this site.

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We can go to the next slide.

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one of the things that we had to look at was how we wanted to ensure that we had the ability to maintain a consistent selection source, regardless of where the lake level may be, because with our future drought, it's hard to predict exactly what the levels may be. And so, we went and looked at the historical levels. And we went and looked at what the CRA projected for a low level for a future drought of record.

15:48

What the district realized is that doing a pumping system down the side of the lake, we do have neighbors on either side. And we wanted to minimize our effect on the boating community as well. So, to avoid that, what we ended up doing was sinking a 30 foot diameter shaft, 185 feet into the ground and then tunneling out 531 feet into the lake bed.

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This was convenient for us because we did own easements down the lake shore under the water line. So we were able to do that and it ultimately is going to provide us with three separate suction sources that we can use as necessary when the lake level changes.

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Here you can see a couple of the construction shots From when we were putting that intake tunnel shaft in obviously going this route was a large upfront investment.

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We felt it was worth the time and the money that it took to provide us really with that three tiered suction source, That variable ability to arm, adjust the future wake level while minimizing the effect on our neighbors and the voters and it presented a long-term excellent return on investment for us, or we're having to maintain a barge out on that side of the lake as well.

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Here, you can see a view inside of the treatment plant. What you see are the first three racks of what ultimately be six full racks. Like I said, we're currently at six million gallons per day production and we are going to be expanding out to 12 million gallons per day. This increase in redundancy also comes with we do we practice on site backwash recovery, which allows us to greatly increase our efficiency.

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We use a poly, aluminum chloride fortunate fluctuation agent that helps us to reduce our total organic compounds and we use that both in our primary and secondary backwash recovery. Ultimately, this is going to allow us to take, like I said, one of our ... plants down If we need to for maintenance at any time, even during the peak season of our summer. And in the winter and spring and fall, it will allow us to totally disassociate the North and Southern sides of our systems if we needed to. If something Calamitous should happen across the Colorado River.

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What you see here is an overview of our backwash recovery.

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Essentially, ignore ah water comes through the primary membranes. Filtrate is is disinfected and supply to the clear well.

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Just as as you might normally expect, the runoff and sludge off from the primary membrane can then go into our secondary membrane system or it again is allowed to process and we can pull the good filtrate back out of that disinfect and ultimately put it in the clear well. And then we can do sludge recovery right to our on-site wastewater system.

18:57

And so, this process allowed us to even minimize the footprint that we have there at that site as well, which was a great advantage to us, especially because, like I alluded to earlier, we do have impervious cover issues that we have to adhere to here on our site.

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The district. At the time that we went and invested in this micro filter, filtration technology also made a large investment in our Supervisory Control and Data Acquisition SCADA Networks.

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So, we use this not only for our water system, but also for our wastewater systems, We do have, because of the topography we deal with, at this part of the high one wakes we we have 120 remote sites between our water and wastewater systems. We're currently in the process right now of implementing a million dollar upgrade. We are installing a new radio system with a private frequency.

19:59

An Omni directional Radios at all of our sites, that this Ethernet radio system is going to offer a significant upgrade to us in our data transmission speeds, and the volume of transmission that we can do at any one particular time. It's also the way the system is designed, we're taking advantage of our existing water towers.

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And we have a circular backbone built so that anyone site, or repeater site that gets lost won't back the system down.

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We can actually repeat the system clockwise or counterclockwise to get the information transfer through, So the State, the system will stay up.

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Finally, looking at our lessons learned, know the district's number. one mission is to provide a safe, clean, reliable, potable water and sanitary sewer service to all of our customers. We go out of our way to communicate with the public through, our website, press releases directly, through our area, h.o.a.s and participation of School one Community Events. We found that this is a valuable way to get feedback.

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Not only on our existing systems, but on our exit systems, that the public would like to see us add, or services, they would like to see us.

21:17

Oh.

21:17

We do the best that we can to ensure that as we re-evaluate our capital improvement plans annually, like I spoke about earlier, we are looking to the future, not just the present, to ensure that our systems are going to be able to capture where we will be at what we predict to be built out.

21:35

We do that through an experienced staff working with people like Pat and having great consultants on hand.

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In a management team that's invested in the district's success has been critical to our long lasting relationships that we've been able to develop here.

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Finally, you know, we have a very proactive board that seeks to ensure the districts meeting its mission reliably and in a cost effective manner, and so is thanks to their participation that we've been able to achieve as much as we have.

22:06

Thanks, Jason. I think one thing that was a key is the the district with a secondary recovery system is used to handling high turbid turbidity water on a regular basis by tree be able to treat ... blog.

22:22

I think one of the lessons on this flooding there was the high quality waters of the Haida lakes. What's quickly?

22:30

Diminish with the flood flood flows, and the amount of debris and solids that people saw. And the district's ability to experience from operating the secondary system was very useful and allowing them to shift from. Normally low turbidity water to a high turbidity water without experience has been gained over the years.

22:53

Operating that secondary system, it would have been much more difficult to try to adjust chemical block levels to allow for sedimentation. I think that's one of the problems that occurred.

23:08

I think the other was just the lack of, uh, identification of the floodplains through the leg in many other. utilities were quickly facilities, Quickly inundated districts, planning past experience with major flood events prepare to survive, to see them all. In law. It wasn't a one-time phenomenon.

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As Jason alluded to, there's been years of planning, resource allocation and dedication to allow the district to safely operate throughout this adverse exam.

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So, thanks, Jason.

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As we're virtual today, we won't. Jason, I want to thank you.

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You'll note the password, lower left corner, for ... certification.

24:01

Jason, any final words?

24:03

I appreciate your time, and Yeah, I guess the final thing I'll say is that, you know, with the turbine conditions, you're right, maybe I should have hit on that a little bit more. But the backwash recovery system, and our ability to use it a little bit more often is what allowed us to keep the system up and operating continuously with. No, no impact to the public, and so while



we did have to do more cleanings to staff were able to handle that because of the experience that you spoke on, and so I think that's a great point.

24:33

So, Jason, I am pleased that you joined us today, and our contact information is below. And if you have interest in our facilities or other facilities, please don't hesitate to contact us.

24:48

But thank you very much for joining us today, and have a good conference.